Access to water reduces poverty

Successful Low-cost water technologies from Latin America

Recent studies indicate that a domestic well can double the income of rural families*. Communal water systems are costly and/or complicated. Domestic systems could be an alternative but traditional technologies usually are not affordable for the rural poor. New options that are affordable like the Asian Treadle pump (Cost 20US$, generating 100 US$/year for 1.3 million families), Baptist well drilling Ceramic filters etc, prove that low-cost technologies have a big potential to increase incomes of rural families

Well drilling (manual)

Baptist and Emas technology for clay/sand ground. Latin America, Bolivia

Drills 2 or 3 inch wells to 90 m deep. Drilling time 10 to 20 meters/day. This technology has become very popular and training programs are finding it difficult to cope with the demand. Even poorer families are paying the cost of 50-150 US $ for their own domestic water system.
The Baptist method is similar to the Indian handsludging but instead of using "hand valves", a metal valve is placed at the bottom of the drill. The technology is disseminated by Baptist missionaries who train well drillers and supply them with a 150 US$ drill equipment. Families that want a well, organize a "water club" and assist the well driller.
Cost : 2 US$/Meter (including 2" PVC Casing, filter and PVC pump)
The Emas method from north Bolivia uses a mud pump for jetting. The Emas pump can lift the water to 30 meter above ground level. The Emas school has trained hundreds of well drillers from Bolivia and other countries in the last 10 years. Over 20.000 systems installed.
Cost; 6 US$/ meter (incl. Drilling, casing, filter, PVC pump, tubing and tank in kitchen)
Use: In both cases users are rural families. The Baptist pump is also used for irrigation.

The Stonehammer for hard ground layers. Nicaragua

Many regions in Nicaragua have hard ground layers where either hand digging or machine drilling is expensive. The Stonehammer is a new drilling method for 3-5 Inch wells to 40 m deep in relatively hard layers. It consists of a heavy hammer hitting directly on a hollow drill head. Compared to traditional well digging, the rotating sludge and Stonehammer method saves 20-60% of time and cost, especially for wells deeper than10m**.** Field tests in India (Arcadis/Euroconsult) and Nicaragua (Cesade/ ICCO/PSa) are promising. Together with local organisations, the Dutch Practica foundation is involved in improvements and field testing.

Water pumping

Ropepumps for communal and domestic use. Central America, Columbia, Argentina

Piston pumps for rural water supplies are costly and relatively complicated. A "new" option, both for communal and domestic wells, is the Ropepump. It has a rotating movement and pumps from wells to 70 m deep. The discharge of the hand pump is 40 l/min (10 m), and the simplicity makes it easy to maintain by users. 90% of the pumps stay functioning, even after many years of operation. This was confirmed by evaluations of IRC*** in Latin America (and Pump Aid, Africa.) Ropepumps are commercially produced in Nicaragua and neighbouring countries by some 20 local workshops. Changing from Mark II piston pumps to Ropepumps, raised the proportion of rural water supply with hand pumps in Nicaragua from 10 to 40%. ((With the Mark II, raise would have been from 10 to 20%. The choice for the Ropepumps raised efficiency of the W&S budget with 100%). Organisations like UNICEF, ao.now use this pump in their projects. Investigations indicate that, even if just used for domestic purposes, the Ropepump generates income. Families with a Ropepump have 220 US$ more income per year than families without a pump.**
Costs: 30 to 90 $, depending pump model, well depth and local conditions.
Use: Communal, domestic and small irrigation. Over 50.000 installed in Central America.

Ropepumps for irrigation. Central America
For irrigation up to 2 ha there are Ropepumps powered by a motor, animal traction or windmills. A Ropepump for deep-wells (up to 50 m. deep) with a 1 HP fuel-efficient gasoline engine is being developed and will cost aprox. 300 $. The windmills combine modern Dutch wind technology with the Nicaraguan Ropepump, and over 220 have been installed.

Storage, drip irrigation

Nica-Australian tanks, Nicaragua
Water storage: When wind Ropepumps are used for irrigation, they are combined with circular water tanks. After basic training, these are made by users with bricks, cement and 1.5 mm wire as reinforcement. A few hundred of these water tanks have been constructed.
Home made drip irrigation (low-pressure) Nicaragua
Besides the commercial available Bucket and Drum kits, another option in Nicaragua is using low-cost plastic hose of 0.5 to 2 inch diameter. Holes of 1.5 mm (easy to clean) are made by hand with a small punch and hoses are connected with pieces of PVC pipes. The advantage of this system is that the users can expand it according to their situation. Since the pressure needed for this system can be as low as 0.5 meter, water tanks do not need to be elevated and can be directly filled by for instance a hand Ropepump. This technology is still being improved and field tested by the NGO Cesade.

Filtering

Ceramic filter for domestic use. Central America, Cuba, Mexico.
At the domestic level, water can be made potable by boiling, adding chlorine or using water filters. However traditional domestic water filters are expensive and most of the cheaper ones are "complicated" to maintain or do not eliminate bacteria. A new option is a ceramic filter that was improved in Nicaragua. Tests in Bangladesh, Mexico and a recent USAID funded investigation in Nicaragua, (Ms Lantagne of MIT university), confirm that this filter removes turbidity and 98 to 100% of the bacteria that cause diarrhoea, cholera and other waterborne diseases. The filtering element is a porous clay "vessel" which is treated with colloidal silver. The cost of water produced by this filter is 1 Dollar cent per 20 litres and the capacity meets the daily potable water requirements of 6 persons. Organizations such as UNICEF now utilise this filter in their projects and over 36.000 filters are in use in Nicaragua and Guatemala. Requests for filter production have been received from 25 countries and starting in 6 .
Costs: 5 $ in Bangladesh, 10 $ in Nicaragua. The filtering element costs 2-4 US$
Use: Domestic purposes for rural and urban families.

* Treadle Pump, a US$20 irrigation pump, generating US$ 100/ year. 1.3 Million in Asia. www.ide.org
** " Investigación en 9 municipios en el norte de Nicaragua." J. v.d. Zee. CESADE. ICCO/PSa
* ** International Reference Centre for water and sanitation www.irc.org

Information:
These technologies are relatively new developments, and web information is still limited.

Well drilling:	Baptist	www.geocities.com/h2oclubs
	Emas	www.emas-international.de
	Stonehammer	www.practicafoundation.nl
Waterpumping, irrigation:		
Rope pump-Handpump model water/sanitation		www.ropepump.com
Ropepumps, Motor, pedal, animal and wind driven, water storage and Low-pressure drip irrigation		www.ropepumps.org
Water filters		www.potpaz.org